ABSTRACT OF THE DISCLOSURE

Systems and methods are described for recording multiple spatially-heterodyned direct to digital holograms in one digital image. A method includes digitally recording, at a first reference beam-object beam angle, a first spatially-heterodyned hologram including spatial heterodyne fringes for Fourier analysis; Fourier analyzing the recorded first spatially-heterodyned hologram by shifting a first original origin of the recorded first spatially-heterodyned hologram to sit on top of a first spatial-heterodyne carrier frequency defined by the first reference beam-object beam angle; digitally recording, at a second reference beam-object beam angle, a second spatially-heterodyned hologram including spatial heterodyne fringes for Fourier analysis; Fourier analyzing the recorded second spatially-heterodyned hologram by shifting a second original origin of the recorded second spatially-heterodyned hologram to sit on top of a second spatial-heterodyne carrier frequency defined by the second reference beam-object beam angle; applying a first digital filter to cut off signals around the first original origin and define a first result; performing a first inverse Fourier transform on the first result; applying a second digital filter to cut off signals around the second original origin and define a second result; and performing a second inverse Fourier transform on the second result, wherein the first reference beam-object beam angle is not equal to the second reference beam-object beam angle and a single digital image includes both the first spatially-heterodyned hologram and the second spatially-heterodyned hologram.